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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,301	12/30/2003	Xing Su	21058/0206690-US0	1668

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EXAMINER	
YU, MELANIE J	

ART UNIT	PAPER NUMBER
1641	

MAIL DATE	DELIVERY MODE
08/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,301	SU ET AL.	
	Examiner	Art Unit	
	MELANIE YU	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,10-12,33,34 and 94-120* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,10-12,33,34 and 94-120* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 May 2008 has been entered.

Claim Objections

2. Claims 95 and 96 are objected to because of the following informalities: Claim 95 recites a gel thickness sufficient to perform "electrophoresis" however the rest of the clam a magentophoresis gel, therefore the thickness should be sufficient to perform magnetophoresis. In claim 96, the term "magnetophoresis" in line 4 appears to be typed twice. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-6, 10-12, 33, 34, 94-120 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the

application was filed, had possession of the claimed invention. Applicant's amendment to claims 1, 33 and 95 recites a "gel matrix thick enough to perform electrophoresis" and the amendment to claim 96 recites a "gel matrix thick enough to perform magnetophoresis", which is not provided for in the instant specification and is new matter. It is noted that instant specification, at paragraph 35, describes a gel that is used for electrophoresis and the specification also describes a gel that is used for magnetophoresis or electrophoresis, but does not teach any required thickness of the gel for performing electrophoresis. Applicant does not define a thickness that is sufficient to perform electrophoresis or magnetophoresis. Applicant's specification fails to provide support for a gel matrix that has a sufficient thickness to perform electrophoresis or magnetophoresis as recited in claims 1, 33, 95 and 96.

. ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1, 2, 5, 10, 33, 94-97, 100, 102, 105, 108, 110, 113, 116 and 118 are rejected under 35 U.S.C. 103(a) as being unpatentable over West et al. (US 6,699,724) in view of Renn et al. (US 3,875,044).

West et al. teach a gel matrix comprising an alginate gel (alginate, col. 3, lines 48-52; col. 14, lines 49-53) comprising pores having a size to sieve molecules of a desired range (sample with molecules to be detected are incubated in the gel with the nanoparticles, therefore the hydrogel matrix must have a pore size large enough to permit movement of molecules, col. 15, lines 6-11; col. 16, lines 20-24) and one or more SERS-enhancing nanoparticles (core diameters start at 1nm and shell thickness starts at 1nm, which means the particle size starts at 3nm, col. 8, lines 23-26; nanoparticles are SERS-enhancing, col. 8, lines 3, lines 63-66; col. 10, lines 64-66) stationary within the gel (nanoshells are embedded to prevent migration, col. 12, lines 56-59). West et al. fail to teach the alginate gel capable of moving the molecules by electrophoresis.

Renn et al. teach that a hydrated gel of alginate, agarose or polyacrylamide gel may be used for electrophoresis, in order to provide a hydrated gel sheet for molecular diffusion processes.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include as the gel of West et al., an agarose or polyacrylamide gel as taught by Renn et al. One having ordinary skill in the art would have been motivated to make such a change as a mere alternative and functionally equivalent hydrogel and since the same gelling and matrix support effect would have been obtained. The use of alternative and functionally equivalent techniques would

have been desirable to those of ordinary skill in the art based on the economics and availability of components. Although West et al. and Renn et al. do not specifically address the method of magnetophoresis, according to the instant specification at paragraph 35, indicates that electorphoresis and magnetophoresis may be performed within the same gel material. Therefore, since the gel material taught by Renn et al. is the same taught in the instant specification, the gel of Renn et al. would also be a magnetophoresis gel and capable of performing magnetophoresis.

With respect to claims 2, 5, 97, 100, 105, 108, 113 and 116, West et al. teach a plurality of nanoparticles to provide a plurality of unique optical signatures (different signals are detected to differentiate between analyte, col. 12, lines 21-28; different signals are controlled by shell thickness, col. 3, lines 18-27).

Regarding claims 10, 94, 102, 110 and 118, West et al. teach a probe attached to the nanoparticles being oligonucleotides, antigens or antibodies (col. 3, lines 51-57) that bind specifically to an analyte (col. 4, lines 42-45).

With respect to claim 33, West et al. teach a system comprising the gel matrix of claim 1, a sample containing at least one analyte (col. 4, lines 64-67); and an optical detection system suitable for detecting SERS signals from the nanoparticles (col. 7, lines 2-6).

2. Claims 3, 4, 11, 12, 34, 98, 99, 103, 104, 106, 107, 111, 112, 114, 115, 119 and 120 are rejected under 35 U.S.C. 103(a) as being unpatentable over West et al. (US 6,699,724) in view of Renn et al. (US 3,875,044), as applied to claim 1, further in view of Schultz et al. (US 6,180,415).

West et al. in view of Renn et al. teach a gel matrix comprising embedded SERS-enhancing nanoparticles, but fail to teach the nanoparticles having Raman-active tags or the nanoparticles having a net charge.

Schultz et al. teach SERS-enhancing nanoparticles comprising one or more Raman active tags of fluorescent dyes and nucleic acids (col. 3, lines 42-48), at least one of the nanoparticles having a net charge (col. 30, lines 55-57) and a computer comprising an algorithm for analysis of the SERS signals obtained from the sample (col. 15, line 66-col. 16, line 4), in order to provide a Raman signal with increased enhancement.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the matrix of West et al. in view of Renn et al., in order to provide a Raman signal with improved sensitivity and more accurately detects the presence of analyte.

Regarding claims 11, 12, 103, 104, 111, 112, 119 and 120, Schultz et al. teach at least some of the nanoparticles comprising a fluorescent label that contributes to the optical signature (col. 23, lines 40-48). The properties of the nanoparticles taught by Schultz et al. are provided for increased Raman signal enhancement.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the gel matrix of West et al. in view of Renn et al., nanoparticle properties described above as taught by Schultz et al., in order to provide a Raman signal with improved sensitivity and more accurately detects the presence of analyte.

3. Claims 6, 101, 109 and 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over West et al. (US 6,699,724) in view of Renn et al. (US 3,875,044), as applied to claim 1, further in view of Mirkin et al. (US 2003/0211488).

West et al. in view of Renn et al. teach a gel matrix comprising nanoparticles, but fail to teach the Raman tag comprising adenine.

Mirkin et al. teach a Raman-active tag being an analog of adenine, poly-adenine (par. 181), in order to utilize a spectroscopic fingerprint in protein-protein screening.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the solid gel matrix of West et al. in view of Renn et al., nanoparticles comprising a Raman-active tag of an analog of adenine as taught by Mirkin et al., in order to provide increased sensitivity and specificity of detection of analyte.

Response to Arguments

4. Applicant's arguments filed 29 May 2008 have been fully considered but they are not persuasive. Applicant argues that to perform electrophoresis a gel requires a sufficient thickness between 1 and 2 mm and solutions flow through the gel. Applicant argues that West is only used as a support to prevent migration of nanoshells and the gels are substantially thinner and functionally different than the recited electrophoresis gel. Applicant's arguments are not persuasive because the hydrogel of West et al. is glucose permeable (col. 13, lines 49-53), which indicates that the gel is thick enough for a sample solution to flow through the gel. The gel is thick enough to provide flow of a sample containing molecules, and therefore the thickness of the gel is sufficient to

perform electrophoresis. Furthermore, West et al. teach an attached probe that binds to an analyte (col. 3, lines 51-57 and col. 4, lines 42-45) and therefore has the same function as the recite claims.

5. Applicant further argues that West et al. teach a thin gel so that targets can easily attach to the nanoshells and therefore the use of a thick gel as taught by Renn would not have been obvious. Applicant's argument is not persuasive because Renn is only relied upon for the gel material and not the gel thickness. Furthermore, Renn may teach a specific gel thickness for electrophoresis, but this teaching does not exclude smaller thicknesses from being sufficient to perform electrophoresis. Applicant further argues that West et al. teach very thin, nanoshell containing hydrogels and therefore teach away from using thick gels. However, applicant's argument is not persuasive because the rejected claims do not recite the required thickness. Furthermore, the gel taught by West et al. has a thickness that is sufficient to provide sample flow through the gel, binding of analytes and stationary nanoparticles, therefore since the molecules and sample can flow through and bind to the gel of West et al., the gel has a sufficient thickness to perform electrophoresis.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MELANIE YU whose telephone number is (571)272-2933. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on (571) 272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Melanie Yu/
Patent Examiner, Art Unit 1641